Army Tactical Sensor To Shooter Operations

TSM UAV/ACS

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Agenda

- Joint C4ISR Sensor Architecture
- Army Tactical Sensor Systems
  - Aerial Common Sensor
  - Shadow 200 TUAV
  - ER/MP Div/Corps TUAV
  - SUAV
  - MAV
  - Current Operations
- Summary

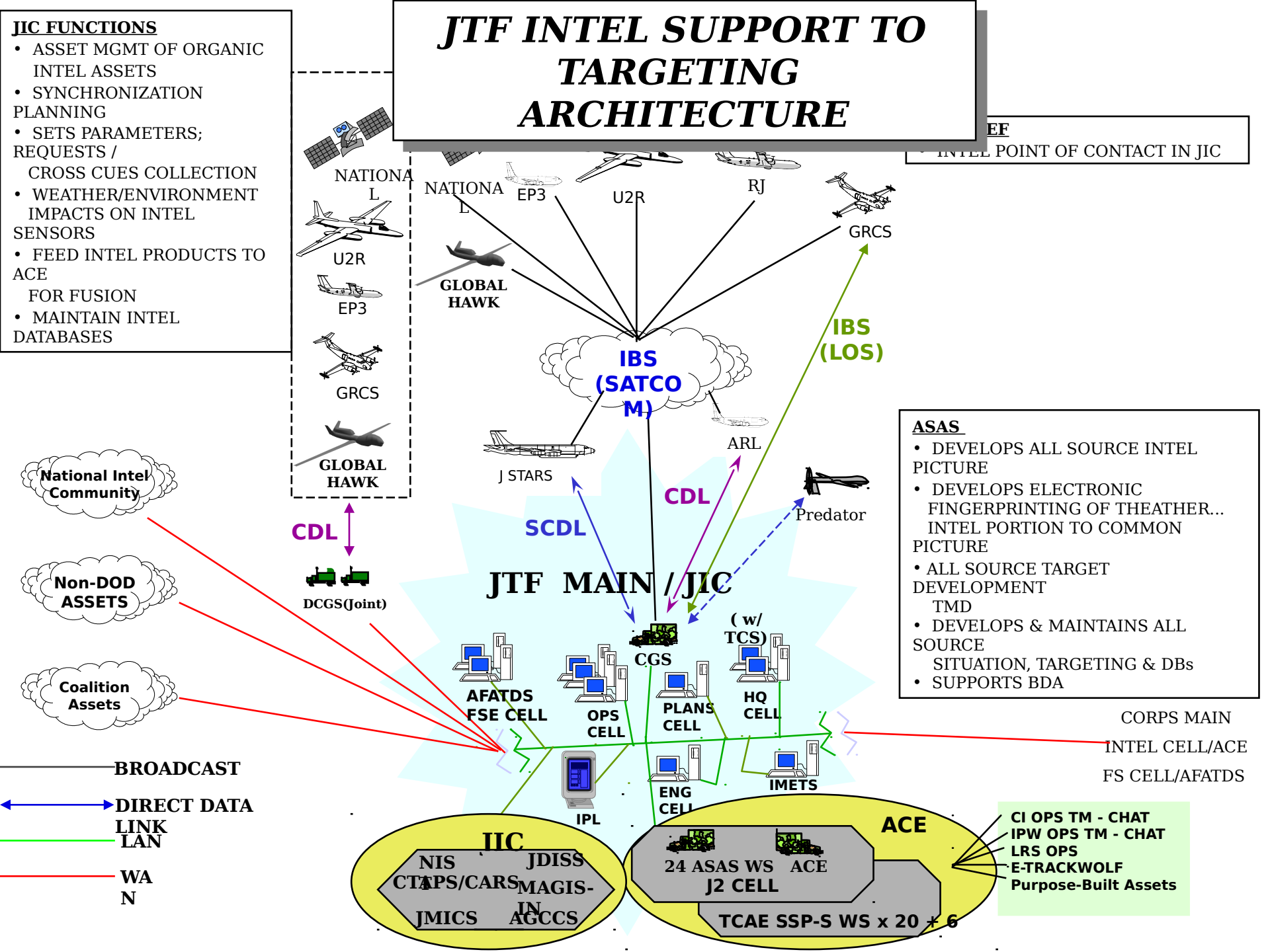
JTF INTEL SUPPORT TO TARGETING ARCHITECTURE

JIC FUNCTIONS

- ASSET MGMT OF ORGANIC INTEL ASSETS
- SYNCHRONIZATION PLANNING
- SETS PARAMETERS; REQUESTS / CROSS CUES COLLECTION
- WEATHER/ENVIRONMENT IMPACTS ON INTEL SENSORS
- FEED INTEL PRODUCTS TO ACE FOR FUSION
- MAINTAIN INTEL DATABASES

EF

- INTEL POINT OF CONTACT IN JIC



ASAS

- DEVELOPS ALL SOURCE INTEL PICTURE
- DEVELOPS ELECTRONIC FINGERPRINTING OF THEATHER... INTEL PORTION TO COMMON PICTURE
- ALL SOURCE TARGET DEVELOPMENT TMD
- DEVELOPS & MAINTAINS ALL SOURCE SITUATION, TARGETING & DBs
- SUPPORTS BDA

CORPS MAIN INTEL CELL/ACE FS CELL/AFATDS

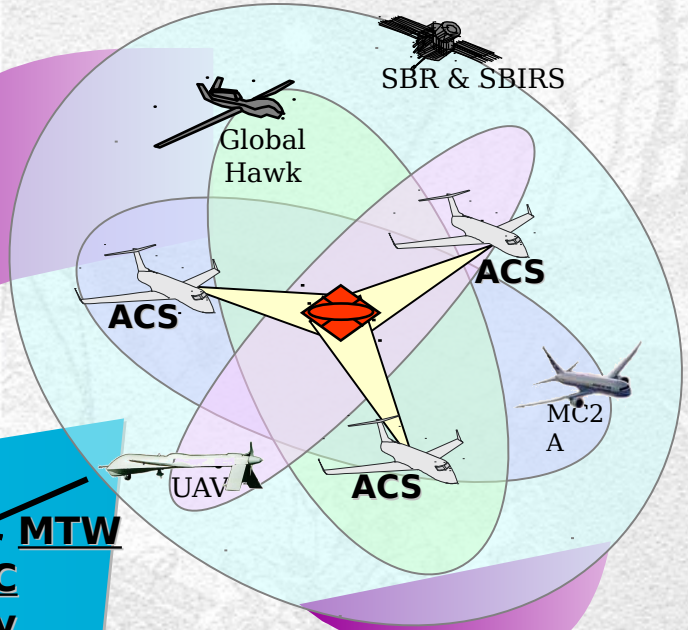
Freedom Through Vigilance
Freedom Through Vigilance
Aerial
Common
Sensor
Full Spectrum Dominance
ACS

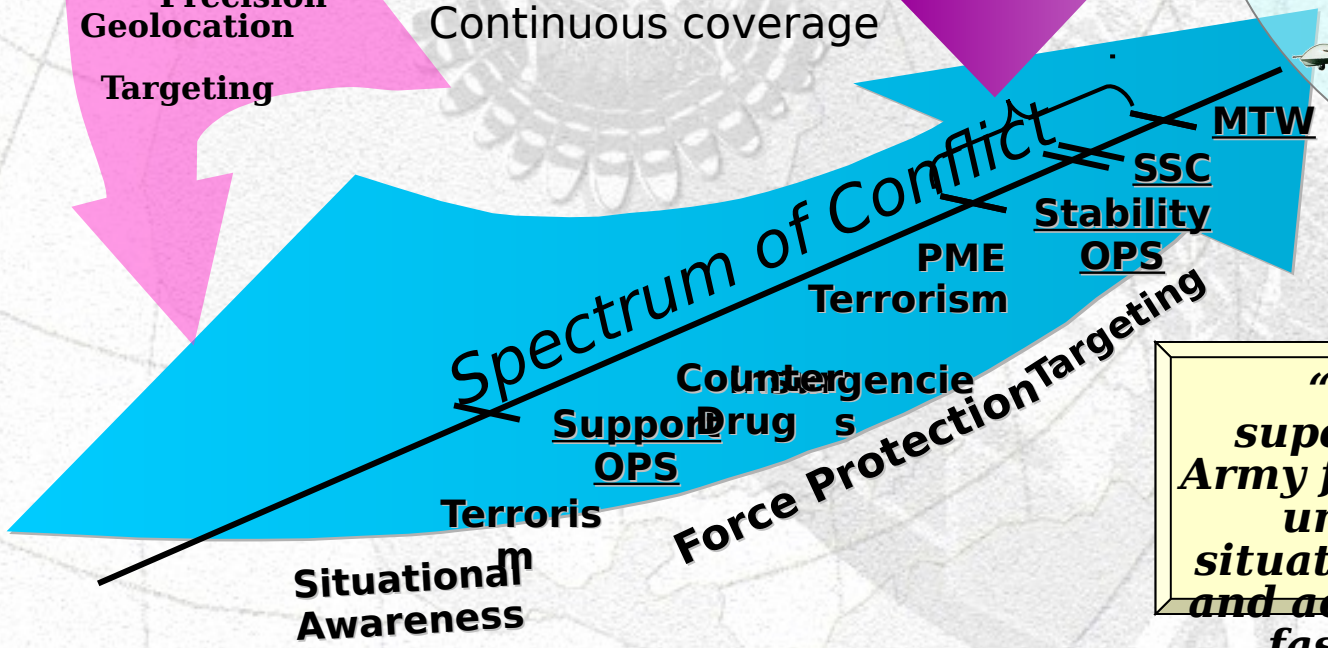
Full Spectrum Dominance

ACS is a KEY ENABLER in the Objective Force's ability to achieve information superiority across the spectrum of conflict

ACS Capabilities:

Rapidly Self deployable
Small forward footprint
Reach back capability
Real Time Precision Multi INT Sensors
Joint Interoperable Sensors
Continuous Dynamically configurable sensors
Precision Continuous coverage
Geolocation
Targeting

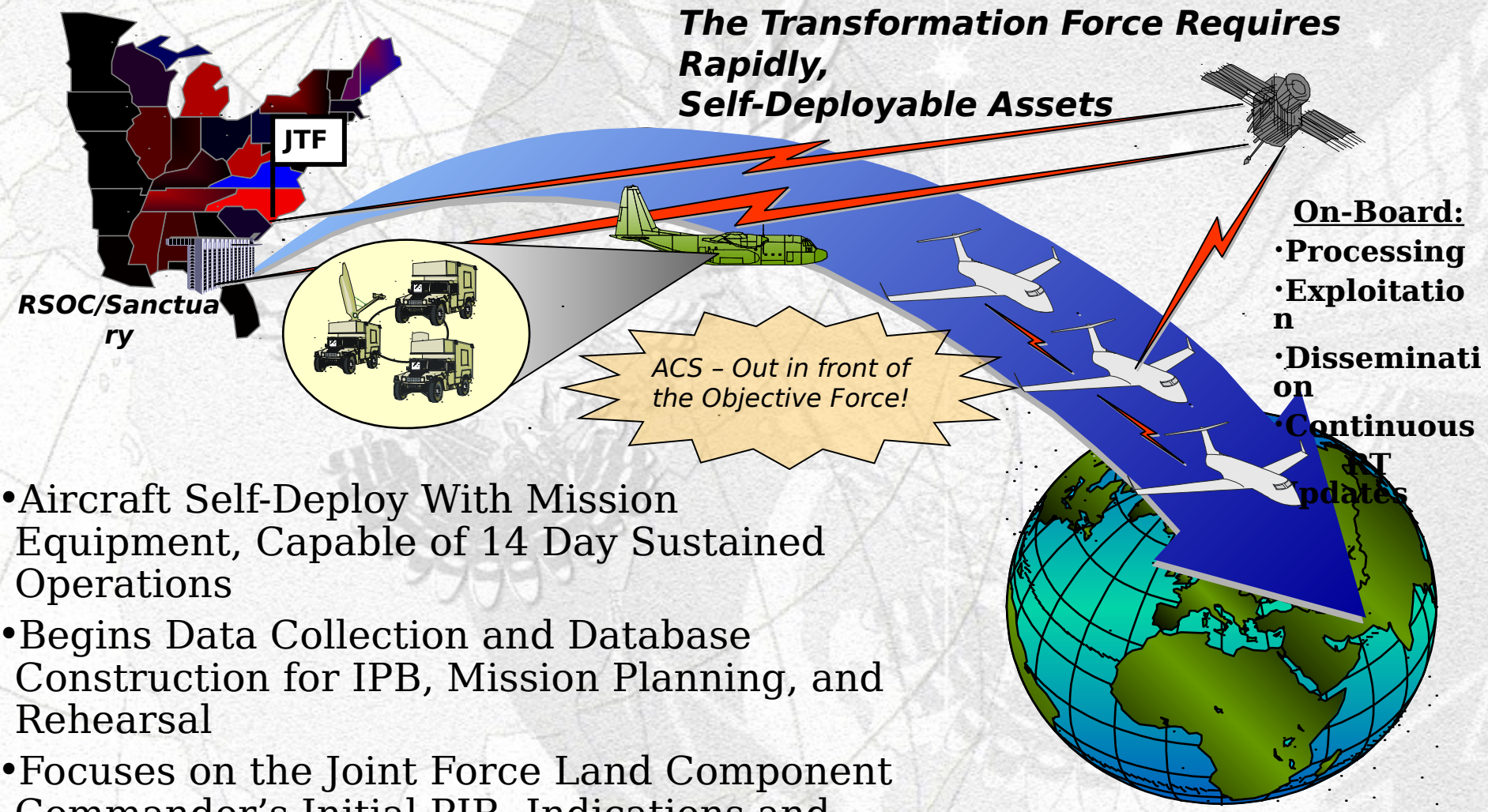




"Information superiority enables Army forces to see first, understand the situation more quickly and accurately, and act faster than their

Phase of Operation – Deploy/Strategic Responsiveness

Strategic Responsiveness, Force Protection, Information Dominance, Operational Agility and Versatility

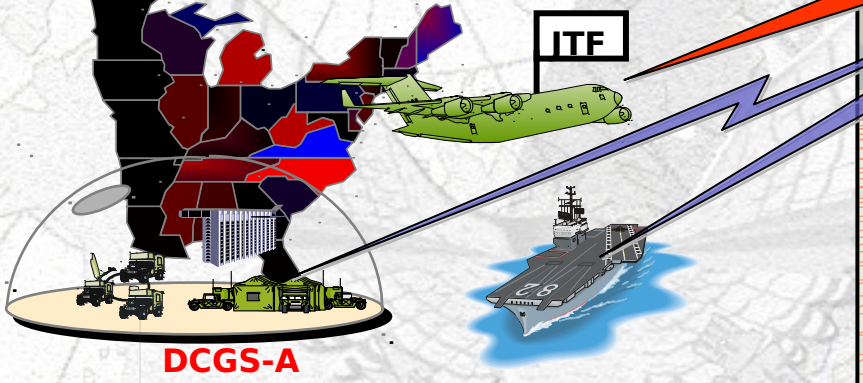


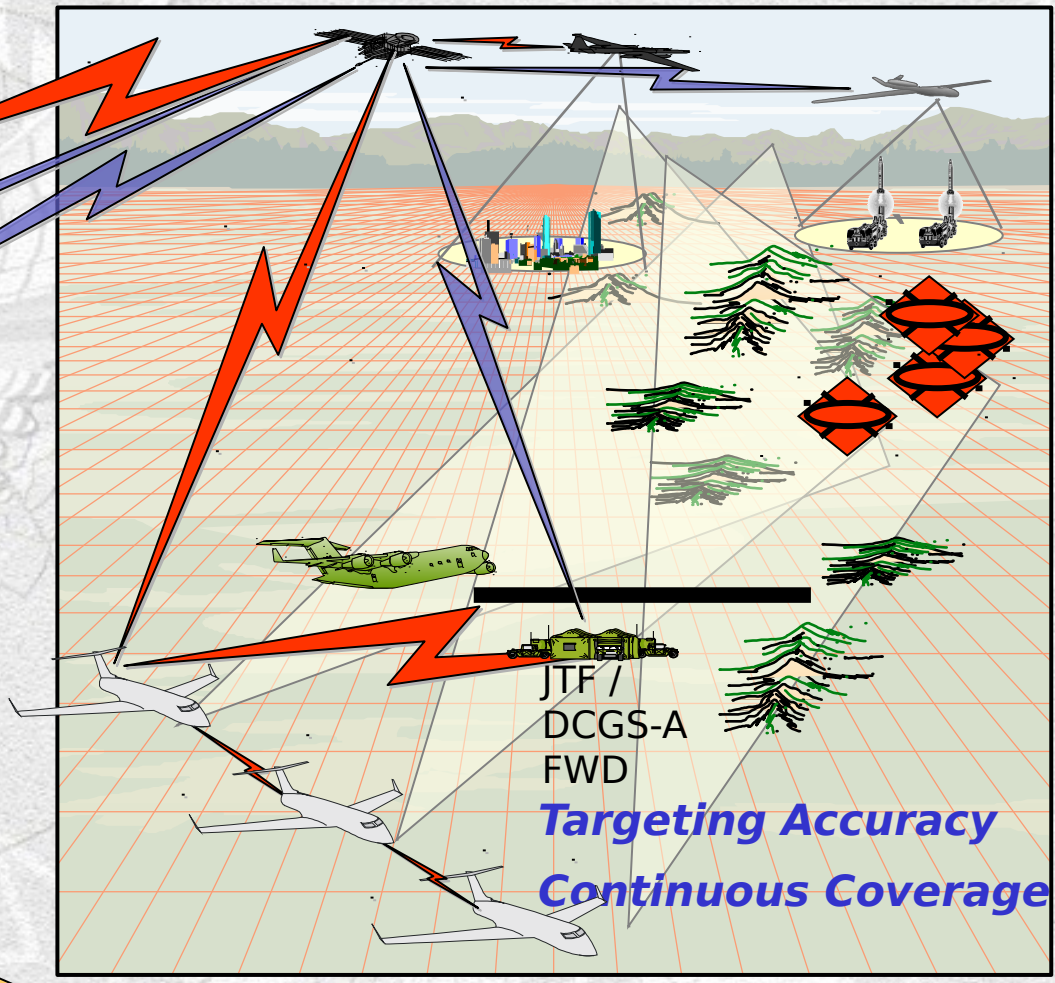
- Aircraft Self-Deploy With Mission Equipment, Capable of 14 Day Sustained Operations
- Begins Data Collection and Database Construction for IPB, Mission Planning, and Rehearsal
- Focuses on the Joint Force Land Component Commander's Initial PIR, Indications and Warning, Electronic IPB of Area of Interest
- Fight on the Fly

Phase of Operation – Deploy / Entry Operations

Strategic Responsiveness, Force Protection, Information Dominance, Operational Agility and Versatility

JTF MSN – Deploy the force, Be prepared to conduct CBT Ops





Commanders PIR

- **Locations, composition, equipment of defending enemy force to include HPT& ISR capabilities**
- **Locate assembly areas**
- **Locate indirect fire weapons systems and units**
- **Locate air defense and missile units**

Force Protection

Situational Awareness

ACS Critical Tasks

Find, Locate, Track & Report

Enemy C2, Special Ops, Air Defense / Artillery / missile / & Armor systems

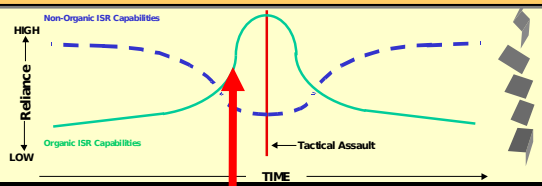
Phase of Operation – Shaping/Decisive Operations

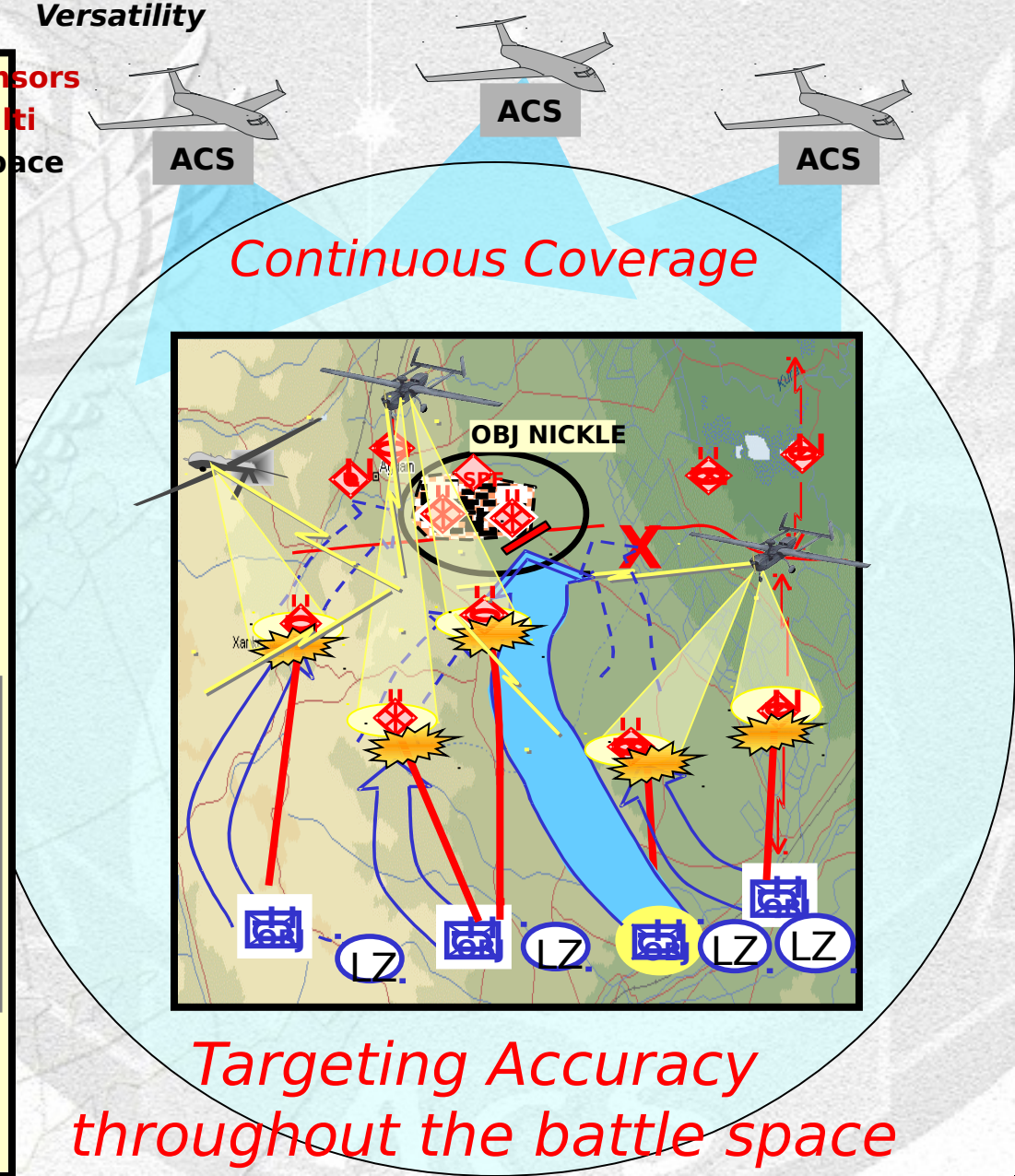
Strategic Responsiveness, Force Protection, Information Dominance, Operational Agility and Versatility

- **UA & UE begin to rely more on organic sensors**
  - **ACS Provides continuous wide area, multi Sensor coverage of the entire battle space (300+km X 300+km)**
  - **ACS Critical Tasks:**
    - **Find, Locate, Track & Report – Enemy C, units, Special Ops, Air defense / missile / Armor systems**
  - **ACS provides the Commander:**
    - **Dominate Situational Awareness**
    - **Force Protection**
    - **Targeting**
    - **BDA**
    - **Dynamic Sensor Cross Cueing**

AOA Findings

- **National / Theater sensors will not provide the accuracy or timeliness required by the tactical Army**
- **UAVs have significant limitations with regard to SWAP and weather**
- **ACS is critical to meeting the information needs of the tactical Commander**

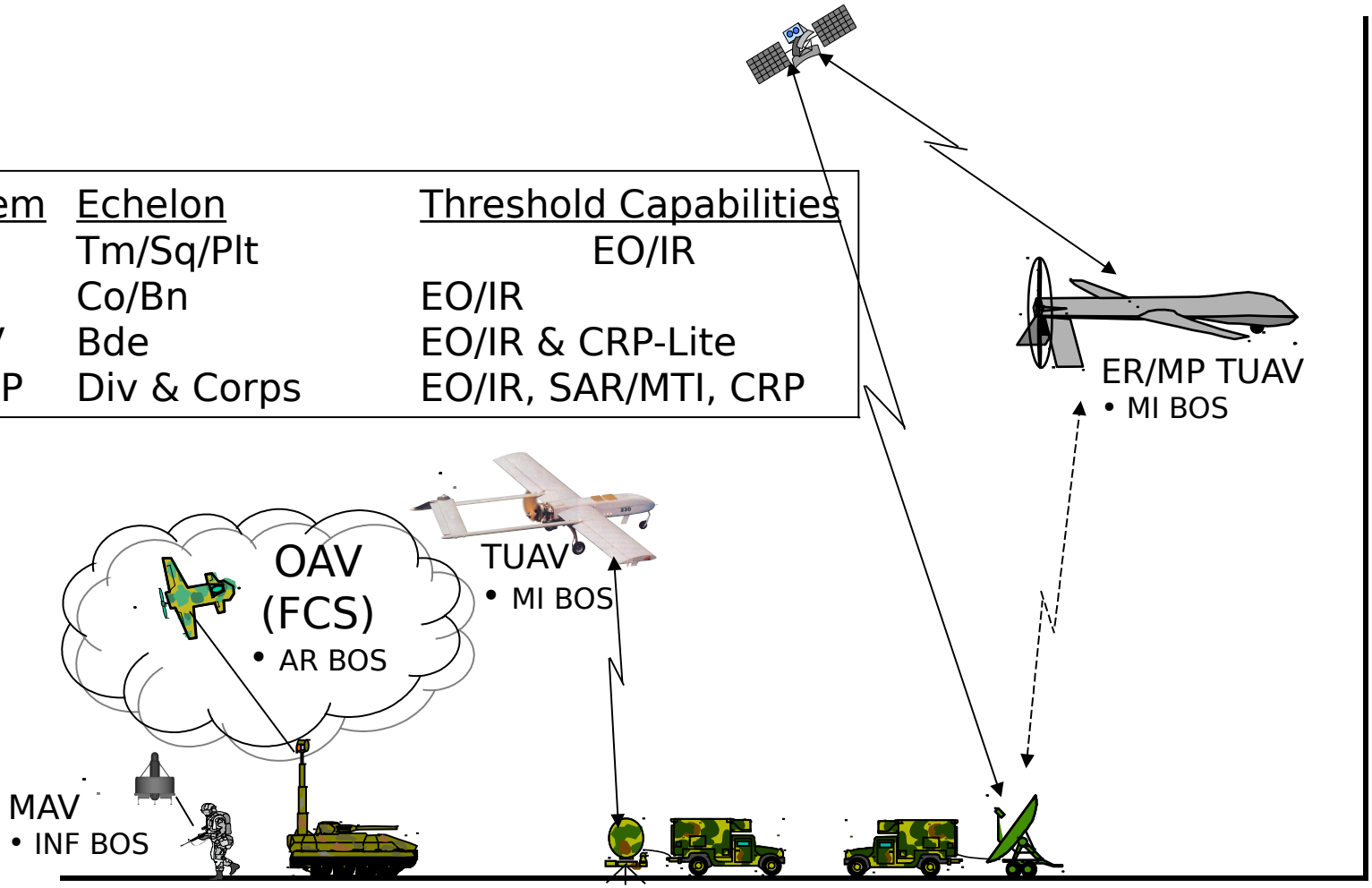


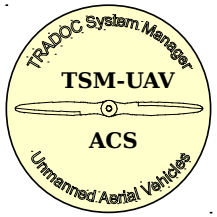


UAV Way-Ahead

Support to Commanders at all Echelons

System	Echelon	Threshold Capabilities
MAV	Tm/Sq/Plt	EO/IR
OAV	Co/Bn	EO/IR
TUAV	Bde	EO/IR & CRP-Lite
ER/MP	Div & Corps	EO/IR, SAR/MTI, CRP





Payloads

PSYOPS

SIGINT

MET

Electronic Support

BIO Detection

Chemical Detection

USI

Laser Designator

Non-Lethal

MSI

HSI

Lethal

MTI

SAR

FOPEN

ASTAMIDS

Laser Illuminator

Comms/Data Relay

Nuclear Detection

Laser Rangefinder

EO

IR

Electronic Attack

Obscurant Dispensing

Current Payload Priorities

	Bde TUAV	Div/Corps TUAV
1.	EO/IR	EO/IR
2.	SAR/MTI	SAR/MTI
3.	CRP	CRP
4.	HSI/USI	

LRE/LI/LD

One Army TUAV System

The system is much more than an airframe

Portable Ground Control Station & Data Terminal

Launcher

Corps (?)

BN & Below

DI V

BDE

Air Vehicles

Payloads

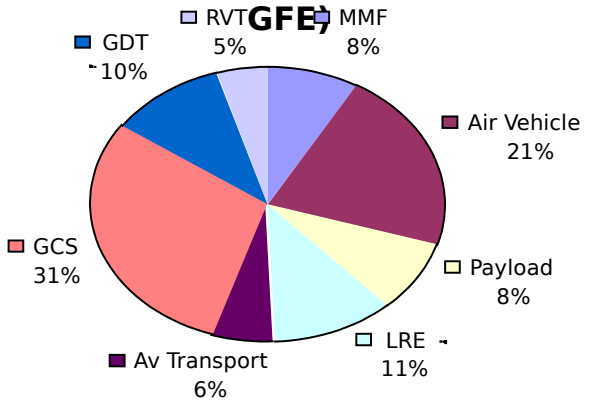
Ground Data Terminals

Ground Control Station and [illegible]

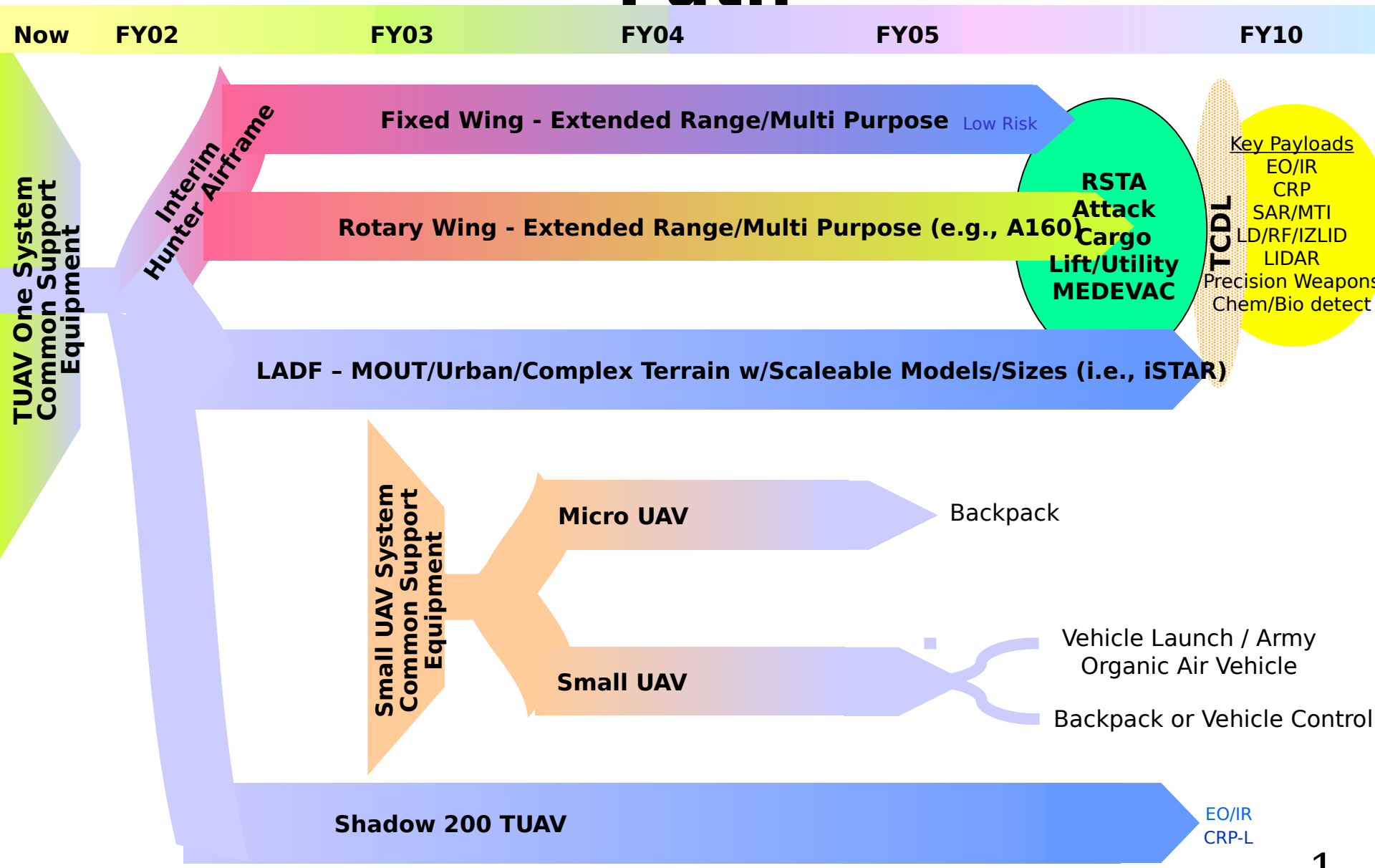
Personnel

Contact Teams

TUAV Hardware Cost (to Include GFE)



An Army UAV Acquisition Path



Tactical UAV Extended Range/Multipurpose (ER/MP)

Extended Range Multi-Purpose (ERMP) Tactical Unmanned Aerial Vehicle (TUAV)

Mission: Army Division & Corps level Reconnaissance, Surveillance, & Target Acquisition, and Command, Control, Communications & Intelligence.

Warfighting Capability:

The Army's Extended Range Multi-Purpose TUAV provides the warfighter a real-time responsive capability to conduct wide area near real time Reconnaissance, Surveillance, and Target Acquisition (RSTA), Command and Control, Manned / Unmanned Teaming (MUM), Signals Intelligence (SIGINT), Electronic Warfare (EW), and special operations missions during peacetime and all levels of war against defended / denied areas over extended periods of time.

Capability/Improvements:

- Airframe Only – Uses Existing Brigade TUAV Ground Control Equipment
- Range: T: 200 kms, O: 300 kms
- Endurance: T: 8 hrs on station, O: 12 hrs on station
- Payload: Greater than 200lbs (Multiple Payloads)
- Automated Takeoff and Landing
- NLOS/BLOS Operations
- Compatible with ABCS
- Tactical Control System (TCS) compatible
- EO/IR, SAR/MTI & CRP Payloads

Program Milestones:

• Required Announcement	FY02
• Contractor Testing & Competition	FY03/04
• Airframe Delivery	FY05
• Initial Training	FY05
• IOC	FY06

Fielding Schedule: TBD

Fielded To: 10 Divisions & 4 Corps (AC)
8 Divisions & 2 Corps (RC)

Div/Corps TUAV Operations
GRCS/ACS
JSTARS
SATCOM Voice
Air Vehicle & Payload Control BLOS/NLOS
SIGINT
RSTA
ABCCC Voice & IFF
CRP
SINCGARS, EPLRS & TOC/TOC comms relay
RSTA
MUM
ASTAMIDS or Chem/BIO
Obscurant Delivery
GDT
GCS
CGS
XX
GCS
GCS
CGS
GDT
GCS
ASAS
AFATDS
TAIS
GCS
XX
TAC
Launch & Recovery
GCS
GCS
X
GCS
GCS
Air Defense IFF

TUAV (Shadow 200)

Tactical Unmanned Aerial Vehicle (TUAV)

Mission: Army tactical level reconnaissance, surveillance, target acquisition, and battle damage assessment.

Capability/Improvements:
- Automatic Landing and Takeoff
- System transportable on 3 C-130s
- Range 50K (Threshold) / 200K (Objective)
- Endurance 4 hrs on station
- OPTEMPO: Threshold: 12 hrs per 24 hrs Objective: 18 hrs per 24 hrs

Contractors:
- AAI Corporation (Prime) / Raytheon (Sub)

Warfighting Capability:

The Army's TUAV is the tactical maneuver commander's primary reconnaissance, surveillance, reconnaissance, and target acquisition system. TUAV provides a greater situational awareness on the battlefield and support commander's ability to shape the battle.

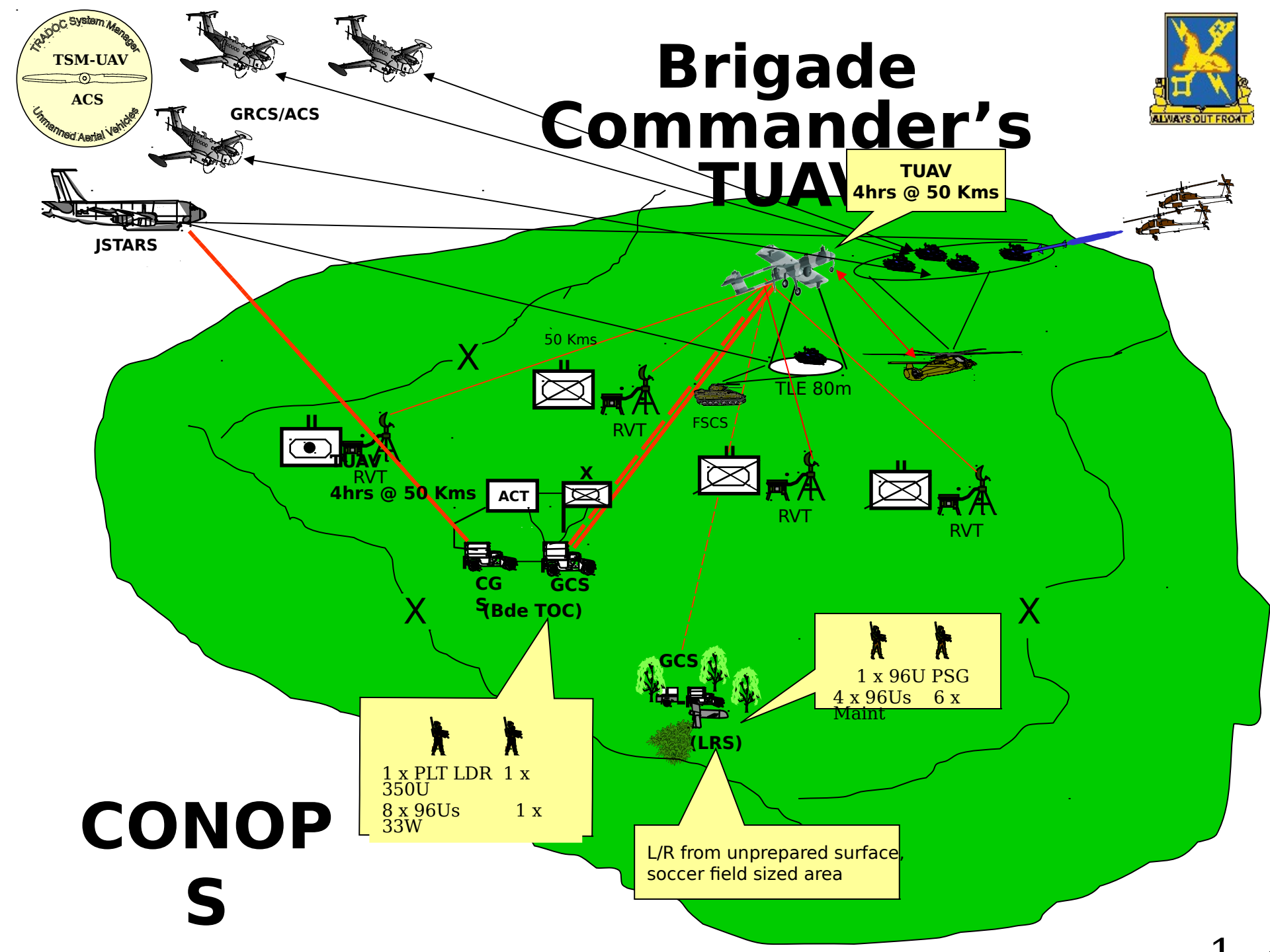
Program Milestones:
- Milestone II ASARC De
- LRIP System Delivery 2Q01
- Initial Training 1Q01
- IOTE 3Q02
- Milestone III 4Q02
- IOC FY03

AAO: 83
APO: 44
ACAT: II

Fielding Schedule:

FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08
2	6	5	10	12	7	8	7

Brigade Commander's TUAV



CONOPS

Shadow 200 TUAV System

TRADOC System Manager
TSM-UAV
ACS
Unmanned Aerial Vehicles

ALWAYS OUT FRONT

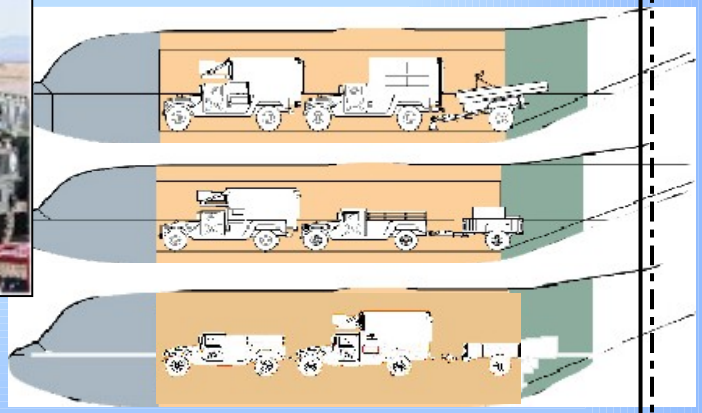
Ground Data Terminal x 2

Remote Video Terminal & Antenna x 4

Portable Ground Control Station & Data Terminal

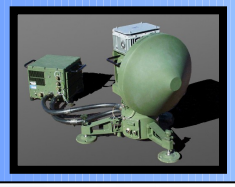
Ground Control Station x 2

Air Vehicles with Payloads x 3



Operations

TALS



Air Vehicle Transport & Launcher Trailer

Deployment

Equipment Trailer

Personnel/ Equipment Transport

Personnel
1 x 35D (Platoon Leader)
1 x 350U (UAV Warrant Officer)
8 x 96 U (Air Vehicle Operators)
1 x 33W (EW System Repairer

Maintenance

Spare Air Vehicle

Personnel/ Equipment

Equipment Trailer

Maintenance Section Multifunctional

Personnel
1 x 96U (Platoon Sergeant)
4 x 96U (Air Vehicle Operators)
3 x 33W (EW System Repairer)
3 x 52D (Engine Mechanic)

Shadow 200 TUAV Fielding Schedule

Fiscal Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Systems Fielded Per Year
01		1 TAFT			1 IOT&E 4ID (M)								2
02	1 Tng Base		1 Tng Base				1 Tng Base		1* 3 Bde 2 ID (IBCT)		1* 4ID (M)	1* 1 Bde 25 ID (IBCT)	6
03					1 Tng Base			1 1 CAV	1 1 CAV		1 2 ID	1 2 ID	5
04		1 IBCT3 (172 SIB)		1 82 ABN	1 82 ABN	1 3 ACR	1 3 ACR	1 1 AD	1 1 ID (M)	1 3 ID (M)	1 101 AA	1 10 MNT	10
05	1 25 ID	1 11 ACR	1 1 CAV	1 82 ABN	1 2 ACR	1 2 ACR	1 4 ID (M)	1 10 MTN	1 1 AD	1 1 AD	1 101 AA	1 101 AA	12
06	1 1 ID (M)	1 1 ID (M)	1 3 ID (M)	1 3 ID (M)	1 25 ID			1 56th Bde 28 ID			1 RC		7
07		1 RC		1 RC	1 RC	1 RC	1 RC		1 RC	1 RC		1 RC	8
08		1 RC		1 RC		1 RC		1 RC	1 RC		1 RC	1 RC	7

* 1st System ("TAFT" – PM's) will be transferred to RC in FY09 timeframe

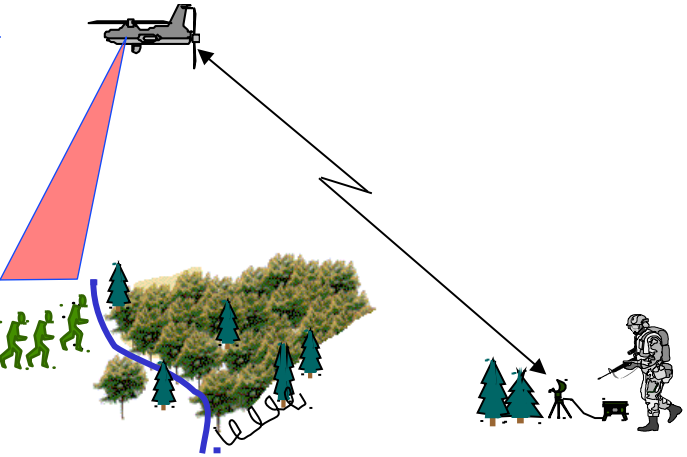
20 February 2002

FY01	FY02	FY03	FY04
LRIP	LRIP	Prod I	Prod II

Small UAV (SUAV)

Small Unmanned Aerial Vehicle (SUAV)

Mission: Battalion & Below (Small unit) level Reconnaissance, Surveillance, & Target Acquisition.



Warfighting Capability:

The SUAV's primary purpose is to mitigate risk and increase operational tempo by providing Electro Optical/Infrared (EO/IR) imagery to the small unit (Battalion and below level units). The SUAV provides the small unit with enhanced situational awareness and increased force protection, by providing the means for expanded reconnaissance, surveillance, coverage of marginal maneuver areas, as well as increased target acquisition capability, and an ability to reduce high-risk exposure points. This combination contributes directly to the small unit's success by facilitating maneuver to points of positional advantage with speed and precision in order to conduct decisive operations.

Capability/Improvements:

- Range: T: 8 kms, O: 12 kms
- Endurance: T: 50 min on station, O: 90 min
- Payload: T: EO/IR, O: with Chem/Bio sensor
- Automated Takeoff and Landing
- LOS operations
- Vehicle Mounted/Dismounted man-packable

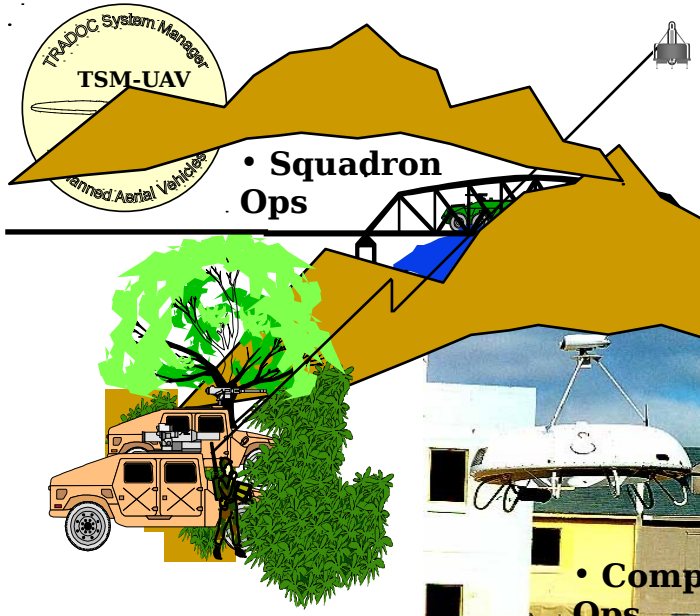
Program Milestones:

- Required Announcement FY02
- Contractor Testing & Competition FY03/04
- System Delivery FY05
- Initial Training FY05
- IOC FY05/06

Fielding Schedule: TBD

Armor (AC): 11 systems per Ar Bn, 6 per Div Cav Sq, 8 per Bde Recon Trp, 31 per ACR Cav Sq, 15 per RSTA Sq
Infantry (AC): 2 systems per Abn, Air Asslt, Mt, Lt and Mech Inf Bn; 4 per IBCT Inf Bn; 2 per LRSC, MI Bn
USASOCOM: SO Avn- 2 systems per Co; SF- 1 per ODA, 2 per ODB; CA- 3 per CA Tac Det, 3 per CA Det, 6 per CA Co; PSYOP- 1 per Tm; Ranger Rgmt- TBD; SO Spt Cmd- 5

Small UAVs



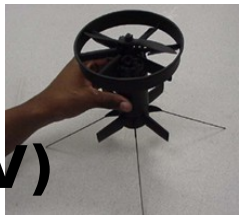
• **Basic**
• **Open & Urban Complex**
Terrain
• **Responsive Force Protection**

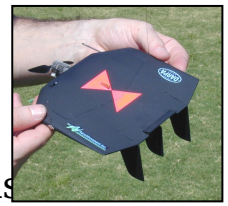
- **Missions**
  - Urban Reconnaissance
  - Recon Over the Next Hill
  - Trails, Routes
  - Hostage Rescue
  - Special Target Reconnais
  - Ambush Sites
  - Counter Drug Operations

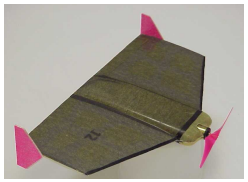
- **Users**
  - SOF
  - Scouts
  - Cavalry
  - Patrols
  - Security Elements
  - Intel Community

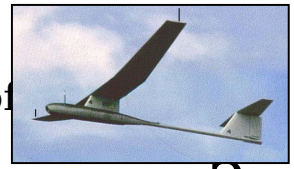
- **Possible Requirements**
  - 10-12 km Range (Mission Dependent)
  - Near Real Time Data
  - Downlink Imagery
  - Very Low Cost (Expendable and Reusable)
  - EO/IR (Day/Night)
  - Simple to Train / Ease of Operation (Initial)

- **Small Unit**
- **Micro (MAV)**









Micro Air Vehicle (MAV)

Army/DARPA Micro Air Vehicle (MAV) System

FY02 ACTD

OBJECTIVES

- ✓Enhance small team situational awareness
- ✓Increase survivability – reduce soldier risk
- ✓Requires:
  - ➢ Light weight/Backpackable UAV system
  - ➢ Minimal training -- capitalizes on:
    - ▪ Automatic launch/recovery (L/R)
    - ▪ Autonomous/semi-automated controlled flight in confined areas – Hover/Perch and Stare
  - ➢ Easy to operate – Non-MOS specific
  - ➢ Imagery transmission - day/night ops
  - ➢ Open, wooded, complex terrain
  - ➢ Urban - Down the street, over the building
  - ➢ Low acoustic signature
  - ➢ Affordable/reusable

R&D

- ✓Technology
  - ➢ Employs COTS Technology
  - ➢ Leverages DARPA MAV & OAV Programs
  - ➢ Airframe, autonomous flight avionics, GPS & non-GPS navigation, robotic behavior, sensor technology, miniaturization, propulsion systems
- ✓Funding: DARPA, Army, and OSD -- $10 million each for a total of $30M.
- ✓Phases: Each of 3 phases will assess 25 systems (4 AVs and 1 User Interface (U/I) per system).
- ✓Residuals provided to 25ID (L)

PARTICIPANTS

DARPA	- Lead Agency/Executing Agent
US Army	- Lead Service
USCINCPAC	- User Sponsor
USARPAC	- Operational Manager
TSM UAV/ACS	- Deputy Operational Manager
DBBL	- Experimentation Manager
PM TUAV	- Transition Manager

SCHEDULE

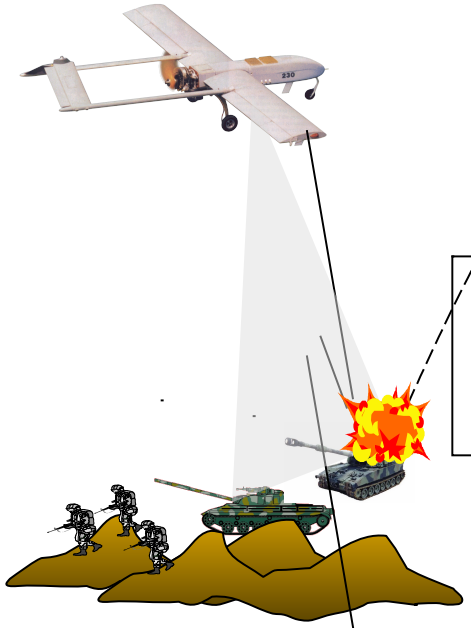
FY 02-03	- Baseline system fielding/evaluation
FY 03-04	- Integrate improved capabilities, fielding/ evaluation of upgraded systems (x2)
FY 04	- Military Utility Assessment
FY 05-06	- Transition Final System/Residuals/

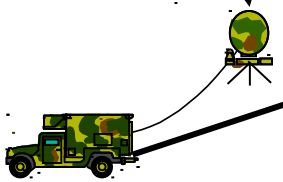
COMMENTS

- ➢ Applications include MOUT, security, force protection, Bio/Chem., Special Ops, etc
- ➢ Revolutionary size & capabilities for a UAV
- ➢ Enables paradigm shift for Tactical R&S
- ➢ Changes sensing paradigm from stand-off to stand-in
- ➢ Quantum leap in small unit situational awareness
- ➢ Critical complex terrain and urban warfare tool
- ➢ US Army: Infantry Center, USASOC, MANSCEN
- ➢ Allied participation in effort: Canada and UK

UAV Support To Targeting

The Brigade TUAV in the Targeting Process





1. GCS sends EOBSREP to ASAS RWS

S303 ENOBSRPT to ASAS RWS Message Handler

If msg meets established parameters

2. ASAS sends TIDAT to AFATDS

TIDAT message

- Decide (Task system)

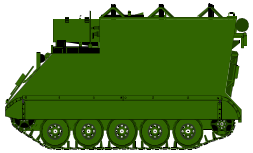
- Detect (Targets)

- Assess (Tgt Damage)

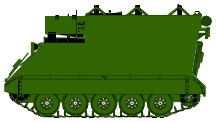
- Decide (To attack)

Decision Makers

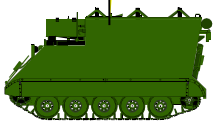
Cdr, S3,S2, FSCOORD



Brigade FSE (AFATDS)
3. Process CFF request



DS Bn TOC (AFATDS)

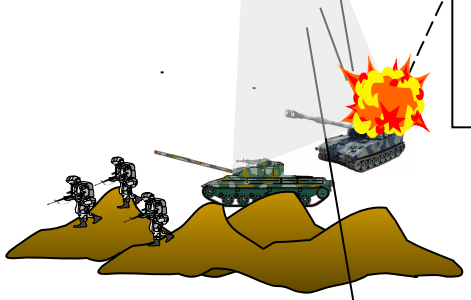


Battery FDC (AFATDS)

4. Execute mission

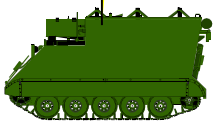
- Deliver (Munitio

The Brigade TUAV in the Targeting Process

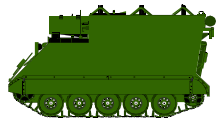


- Deliver (Munition

3. Execute mission



Battery FDC (AFATDS)

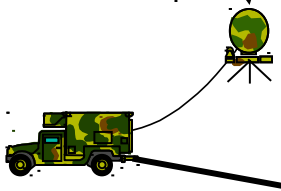


DS Bn TOC (AFATDS)

- Decide (To attack)

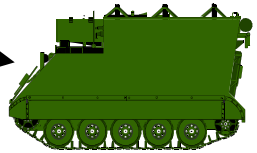
Decision Makers

Cdr, S3,S2, FSCOORD



1. GCS sends K02.04 Call for Fire message

Time Sensitive



Brigade FSE (AFATDS)
2. Process CFF request

- Decide (Task system)
- Detect (Targets)
- Assess (Tgt Damage)

Army UAV Current Operations

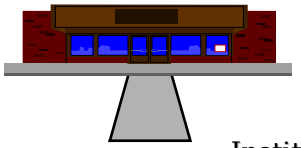
Hunter UAV as Interim Solution for TUAV

Current HUNTER Utilization

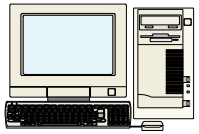
TRADOC System Manager
TSM-UAV
ACS
Unmanned Aerial Vehicles

USAIC&FH
Fort Huachuca, AZ
E Co/305th MI Bn

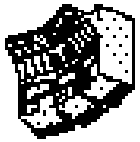
US Army Intel School

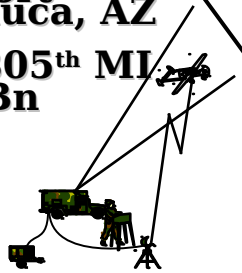


Computer Based Training



Institutional Mission Simulators

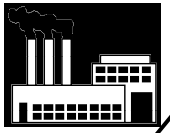




Joint UAV Training Center

PM Demo Team
Sierra Vista, AZ
TRW, Inc.

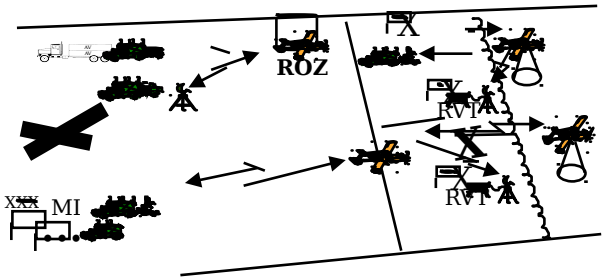
- Contractor Operated
- Tailor to Fit Mission
- Turn Key
- Proven Track Record



III CORPS
Fort Hood, TX
A Co/15th MI Bn (AEB)

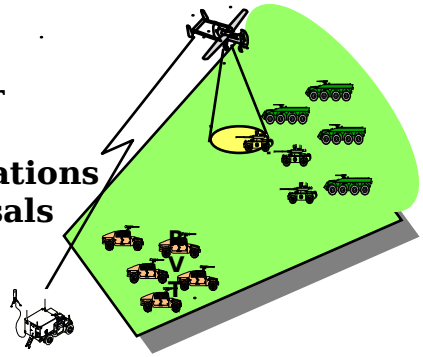
ALWAYS OUT FRONT

- CONOPS and TTP for Heavy Forces
- Warfighting Exercises and Force XXI
- Real World



JRTC OPSGRP
Fort Polk, LA
21st MICAS

- CONOPS and TTP for Light Forces
- Eight Warfighter rotations
- Two Mission Rehearsals Exercises (MREs)

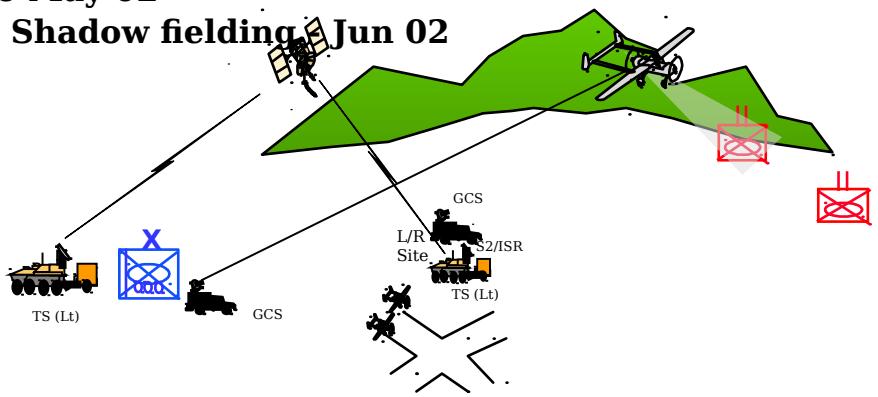


Hunter UAV support to 10 JRTC training rotations per year.

(T) HQDA decision 2Apr02 to stand-up a Hunter unit for XVIII ABC; 21st MICAS will

- CONOPS and TTP for BCT
- Hunter as Surrogate TUAV
- Fielded to IBCT 1 - Sep 00
- Turned-in Hunter - Mar 02
- Hunter-to-Shadow training - Mar to May 02
- Shadow fielding Jun 02

IBCT
Fort Lewis, WA
D Trp, 1-14 CAV



IBCT 2 Shadow training: May-Aug02; Shadow

Summary

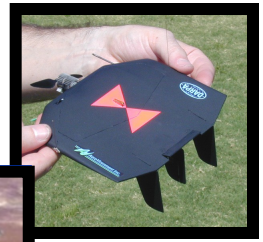
- **ACS ORD Update - DA G-3**
- **Mnvr Cdr's TUAV [Shadow 200] - Current acquisition**
- **ER/MP TUAV ORD [Div/Corps] - HQs TRADOC**
- **Small UAV (SUAV) ORD [Bn & Below] - Working**
- **Initiating MAV ACTD w/DARPA - Contract Awarded**

Bde Cdr's TUAV

ER/MP TUAV (Surrogate)

SUAV

OAV



MAV